Table 5.
Estimated Airport Operations Economic Impacts by Industry (Percent of Total)

Northwest Region				
Industry	IMPLAN Sector	Total	Total Employee Compensation	Total
Industry	Sector	Employment	•	Output
Agriculture	1	0.4%	0.1%	0.3%
Mining	28	0.0%	0.0%	0.0%
Construction	48	0.6%	0.7%	0.5%
Manufacturing	58	0.9%	1.3%	3.6%
TCPU	433	76.5%	82.0%	78.2%
Trade	447	9.2%	5.9%	5.0%
FIRE	456	1.8%	1.6%	4.9%
Services	463	9.8%	7.6%	6.8%
Government	510	0.4%	0.6%	0.6%
Institutions	516	0.4%	0.1%	0.0%
Other	30001	0.0%	0.0%	0.0%

Table 5.
Estimated Airport Operations Economic Impacts by Industry (Percent of Total)

Olympic Region				
	IMPLAN	Total	Total Employee	Total
Industry	Sector	Employment	Compensation	Output
Agriculture	1	0.3%	0.1%	0.2%
Mining	28	0.0%	0.0%	0.1%
Construction	48	0.6%	0.5%	0.5%
Manufacturing	58	0.6%	0.8%	1.3%
TCPU	433	77.7%	81.8%	78.8%
Trade	447	8.3%	5.6%	5.2%
FIRE	456	2.1%	1.8%	5.3%
Services	463	9.5%	8.4%	7.6%
Government	510	0.3%	0.8%	1.0%
Institutions	516	0.3%	0.1%	0.0%
Other	30001	0.0%	0.0%	0.0%



Table 5.
Estimated Airport Operations Economic Impacts by Industry (Percent of Total)

South Central Region				
	IMPLAN	Total	Total Employee	Total
Industry	Sector	Employment	Compensation	Output
Agriculture	1	0.3%	0.2%	0.4%
Mining	28	0.0%	0.0%	0.0%
Construction	48	0.5%	0.5%	0.6%
Manufacturing	58	0.6%	0.7%	1.6%
TCPU	433	76.3%	82.4%	74.0%
Trade	447	9.7%	5.9%	6.9%
FIRE	456	2.0%	1.5%	6.0%
Services	463	9.9%	8.1%	9.1%
Government	510	0.3%	0.8%	1.3%
Institutions	516	0.3%	0.1%	0.0%
Other	30001	0.0%	0.0%	0.0%

Table 5.
Estimated Airport Operations Economic Impacts by Industry (Percent of Total)

Southwest Region				
Industry	IMPLAN Sector	Total Employment	Total Employee Compensation	Total Output
Agriculture	1	0.0%	0.1%	0.1%
Mining	28	0.0%	0.0%	0.0%
Construction	48	0.4%	0.7%	0.4%
Manufacturing	58	0.4%	0.8%	0.9%
TCPU	433	86.3%	82.0%	87.1%
Trade	447	5.6%	5.8%	3.3%
FIRE	456	1.3%	2.0%	3.3%
Services	463	5.6%	7.7%	4.3%
Government	510	0.4%	0.7%	0.6%
Institutions	516	0.0%	0.1%	0.0%
Other	30001	0.0%	0.0%	0.0%

Source: MIG, IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

2. Capital Facilities Expenditures

Washington's general aviation and commercial airports undertook an estimated \$93.6 million in capital improvements in 2000. The primary purpose of the capital projects was to replace or rehabilitate airport facilities, such as new pavement and lighting systems. Paving projects were the most common type of capital expenditures in 2000. Other projects covered a wide range of planning services, including airport master planning, system planning, noise studies and environmental review, installation of safety features (e.g. fencing and lighting), and utility upgrades. A few airports undertook major construction projects (e.g. new terminals), and purchase of land and equipment. The IMPLAN sectors used to model capital expenditures are presented in Table 6 along with the corresponding SIC code.



Table 6. IMPLAN Sectors used to Model Capital Expenditures

Capital Spending by Type	IMPLAN Model Sector	Standard Industrial Classification
Construction – Paving	51 New Highways and Streets	Part 15, 16, 17
Construction - Other	49 New Industrial and Commercial Buildings	Part 15, 16, 17
Planning	506 Engineering, Architectural Services	8710
Equipment	309 Farm Machinery and Equipment	3523
Real Estate	462 Real Estate	6500

IMPLAN sectors 49 and 51 include parts of SIC Major Groups 15, 16 and 17. Major Group 15 - Building Construction - General Contractors and Operative Builders - includes general contractors primarily engaged in the construction (including new work, additions, alterations, remodeling and repair) of industrial buildings, warehouses and other buildings, including passenger and freight terminal buildings. Major Group 16 - Heavy Construction Other Than Building Construction - Contractors - includes highway and street construction, which includes airport runway construction, asphalt paving, grading, installation of signs, resurfacing, and pavement maintenance and repair. Major Group 17 - Construction - Special Trade Contractors - includes a wide variety of special trade contractors including painting, plumbing, heating and air-conditioning, sheet metal work, carpentry, electrical, masonry, glass, etc.

Major Group 87 - Engineering, Accounting, Research, Management, and Related Services - includes firms commonly used to prepare airport-related planning and environmental studies. Major Group 35 - Commercial Machinery and Computer Equipment - includes commercial mowing and other turf and grounds care equipment. Major Group 65 - Real Estate - includes real estate operators, owners and lessors of real property, as well as buyers, sellers, developers, agents and brokers.

As with other spending, not all spending on capital projects occurs within the local economy. A number of assumptions were made to estimate the leakage of spending that occurs outside the county, region and state associated with capital projects. The assumptions are based on conversations with airport managers regarding the amount of work that is done "in-house", contracted to local firms (i.e. firms within the airport's county), and contracted to firms within the region (i.e. WSDOT transportation region) or state. Based on these conversations, the following assumptions were made:

Table 7.
Local and Regional Share of Capital Spending

Capital Spending by Type	% Spending in County	% Spending in Region	% Spending Outside State
Construction – Paving	80%	20%	
Construction - Other	50%	40%	10%
Planning	80%	20%	
Equipment		100%	
Real Estate	100%		



Regional purchase coefficients were used to account for the proportion of local demand purchased from local producers. The economic impacts associated with capital spending at airports are summarized in Table 8. Estimated job, income and spending impacts are presented for each region and for the state as a whole.

Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

Washington State				
Employee Total				
Compensation Employment Output				
Washington State	\$42.0	1,426	\$137.9	

Excludes Sea-Tac International Airport

Source: MIG, IMLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

The Central Puget Sound, Eastern and South Central regions accounted for a significant share (89%) of total output generated by airport capital spending within the state. The Central Puget Sound Region accounted for 46% of total output, with significant spending (from over \$1 million to \$22 million per airport) on large construction and planning studies at Boeing Field, Paine Field, Harvey Field, Auburn Municipal and Tacoma Narrows. The Eastern Region accounted for 29%, and included significant capital projects at Spokane International, Pullman-Moscow Regional and Deer Park. The South Central Region accounted for 14%, and included large capital projects at Walla Walla Regional, Tri-Cities and Yakima Air Terminal. The next largest contributor was the Northwest Region, which accounted for about 6% of total output, with large capital projects at Bellingham International and Friday Harbor Airport.

Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

Central Puget Sound Region					
	Employee		Total		
County	Compensation	Employment	Output		
King*	\$8.8	253	\$27.1		
Kitsap	\$0.1	4	\$0.4		
Pierce	\$0.7	26	\$2.2		
Snohomish	\$3.2	110	\$11.5		
County Total	\$12.8	393	\$41.1		
Region Total	\$20.4	671	\$63.9		

Excludes Sea-Tac International Airport



Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

Eastern Region					
	Employee		Total		
County	Compensation	Employment	Output		
Adams+	\$0.02	1	\$0.1		
Lincoln	\$0.003	0.1	\$0.06		
Pend Oreille+					
Spokane	\$8.4	327	\$29.6		
Stevens	\$0.003	0.1	\$0.01		
Whitman	\$0.2	10	\$0.9		
County Total	\$8.7	338	\$30.7		
Region Total	\$11.1	441	\$40.1		

Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

North Central Region				
County	Employee Compensation	Employment	Total Output	
Chelan				
Douglas	\$0.09	3	\$0.3	
Ferry+	\$0.0002	0	\$0.002	
Grant	\$0.1	4	\$0.4	
Okanogan	\$0.005	0.2	\$0.04	
County Total	\$0.2	7	\$0.8	
Region Total	\$0.3	12	\$1.2	

Source: MIG, IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

Northwest Region				
	Employee	_	Total	
County	Compensation	Employment	Output	
Island	\$0.01	0.6	\$0.05	
San Juan	\$0.2	12	\$1.1	
Skagit	\$0.09	4	\$0.4	
Whatcom	\$1.2	40	\$3.8	
County Total	\$1.5	56	\$5.4	
Region Total	\$2.2	82	\$7.9	



Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

Olympic Region					
	Employee		Total		
County	Compensation	Employment	Output		
Clallam	\$0.3	14	\$1.4		
Grays Harbor	\$0.02	0.6	\$0.07		
Jefferson	\$0.007	0.3	\$0.03		
Mason	\$0.06	2	\$0.2		
Thurston			ľ		
County Total	\$0.4	17	\$1.7		
Region Total	\$0.3	12	\$2.1		

Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

South Central Region				
County	Employee Compensation	Employment	Total Output	
Benton	\$0.05	2	\$0.2	
Franklin	\$0.5	19	\$1.9	
Kittitas	\$0.007	0.6	\$0.2	
Walla Walla	\$1.5	68	\$6.5	
Yakima	\$0.3	13	\$1.2	
County Total	\$2.4	102	\$9.9	
Region Total	\$5.0	196	\$18.8	

Source: MIG, IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

Table 8.
Estimated Economic Benefits of Capital Spending (Millions \$98)

Southwest Region				
County	Employee Compensation	Employment	Total Output	
Clark	\$0.01	0.4	\$0.05	
Cowlitz				
Klickitat				
Lewis				
Pacific+	-			
County Total	\$0.01	0.4	\$0.05	
Region Total	\$0.02	1	\$0.08	



B. Fixed Base Operators (FBO's) and Aviation-Related Businesses

Washington's general aviation and commercial service airports provide facilities for corporate travel, pilot training, and recreational flyers, and are centers for over 200 aviation-related businesses. These businesses rely on the State's airports for all or a portion of their business activity. Types of businesses located at or near airports include: aircraft and engine maintenance and repair, flight training, aircraft upholstery, electronic and other aviation supplies, aircraft sales, agriculture and other flight services, fuel, aviation museums, air tours, restaurants, lodging, and engineering and manufacturing services.

A total of 210 airport business surveys were sent to business owners. Of the total, 45 surveys or 21% were returned, and 33 or 16% contained sufficient data for the IMPLAN model. For those airport businesses not responding and those that returned an incomplete survey, economic impacts were estimated based on the median direct jobs, income and spending for the 33 airport businesses that returned complete surveys. The low response rate likely results in bias in the estimated impacts used for non-reporting businesses. Given the small sample to draw upon, the impact estimates are likely to understate economic impacts, particularly for airports with a greater number and diversity of businesses than those that returned surveys. This is particularly true for counties and regions that include commercial service airports and for general service airports with many associated businesses, particularly those in the Puget Sound Region. It should also be noted that FBO and aviation-related business impacts for Sea-Tac International Airport and Boeing Field are included in the impacts for airport operations. Therefore, the impacts presented for the State of Washington and Central Puget Sound Region are also understated.

County governments, municipalities and port districts that own and operate airports were excluded from the airport business economic impact estimates to avoid double counting. For example, Ferry County owns and operates the Ferry County Airport. The jobs, income and spending impacts associated with operation of the Ferry County Airport are included in the airport operations impacts. Including them in the airport business impacts would overstate the economic contribution of the airport. Organizations sponsoring air shows, fly-ins and other special aviation events are excluded to avoid double counting impacts associated with these events, which were estimated earlier in association with airport operations. Local EEA chapters and non-profit flying clubs were also excluded from the impact analysis.

Business Operations

The 33 airport businesses returning completed surveys provided direct employment for 484 people, and supported \$10.8 million in salaries and benefits and \$36.9 million in spending in 2000.

Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

Washington State				
Employee Total				
Compensation Employment Output				
Washington State	\$40.1	1,968	\$136.3	

Excludes Sea-Tac International Airport



Fixed-base operators and aviation businesses in the Central Puget Sound, North Central, Eastern and Northwest regions accounted for 81% of total output generated by aviation and aviation-related businesses within the state. The Central Puget Sound Region accounted for 42% of total output. Airports with significant business operations (\$1 million or more in total output) include Boeing Field, Tacoma Narrows, Paine Field, Arlington Municipal, Thun Field, Renton Municipal, Bremerton National, Auburn Municipal, and Harvey Field. The North Central Region accounted for 18% of total output. Airports with significant business operations include Pangborn Memorial and Grant County Airport. The Eastern Region accounted for 13% of total output. Airports with significant business operations include Spokane International, Felts Field and Deer Park. The Northwest Region accounted for 7% of total output. Airports with significant business operations include Bellingham International, Skagit Regional, Friday Harbor, Anacortes and Orcas Island.

Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

Central Puget Sound Region				
	Employee			
County	Compensation	Employment	Output	
King*	\$6.2	326	\$19.2	
Kitsap	\$0.8	51	\$2.9	
Pierce	\$5.2	238	\$16.8	
Snohomish	\$4.5	291	\$16.2	
County Total	\$16.6	906	\$55.1	
Region Total	\$18.0	918	\$57.8	

Excludes Sea-Tac International Airport

Source: MIG, IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

Eastern Region			
	Employee		Total
County	Compensation	Employment	Output
Adams+	\$0.1	8	\$0.5
Lincoln	\$0.2	16	\$0.9
Pend Oreille+			
Spokane	\$4.1	208	\$15.7
Stevens	\$0.1	8	\$0.5
Whitman	\$0.2	16	\$0.7
County Total	\$4.8	255	\$18.3
Region Total	\$4.6	248	\$17.8



Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

North Central Region			
	Employee		Total
County	Compensation	Employment	Output
Chelan	\$0.1	9	\$0.5
Douglas	\$5.4	177	\$17.9
Ferry+			
Grant	\$0.7	40	\$2.5
Okanogan	\$0.4	29	\$1.6
County Total	\$6.6	255	\$22.6
Region Total	\$7.1	283	\$23.9

Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

Northwest Region				
County	Employee Compensation	Total Output		
Island		-		
San Juan	\$0.8	57	\$3.5	
Skagit	\$0.8	48	\$2.9	
Whatcom	\$0.6	38	\$2.3	
County Total	\$2.2	143	\$8.7	
Region Total	\$2.4	148	\$9.3	

Source: MIG, IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

Olympic Region				
	Employee		Total	
County	Compensation	Employment	Output	
Clallam	\$0.3	26	\$1.0	
Grays Harbor	\$0.4	26	\$1.6	
Jefferson	\$0.2	12	\$0.6	
Mason	\$0.1	9	\$0.5	
Thurston	\$0.8	52	\$2.9	
County Total	\$1.9	124	\$6.7	
Region Total	\$1.9	125	\$6.8	



Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

South Central Region				
	Employee		Total	
County	Compensation	Employment	Output	
Benton	\$0.6	41	\$2.1	
Franklin	\$0.4	27	\$1.6	
Kittitas	\$0.1	10	\$0.5	
Walla Walla	\$0.6	38	\$2.2	
Yakima	\$0.3	19	\$1.1	
County Total	\$2.0	134	\$7.6	
Region Total	\$2.1	138	\$7.9	

Table 9.
Estimated Economic Benefits of FBO's and Aviation-Related Businesses (Millions \$98)

Southwest Region				
County	Employee Compensation	Employment	Total Output	
Clark	\$0.3	18	\$1.1	
Cowlitz	\$0.3	16	\$0.9	
Klickitat	\$0.1	8	\$0.5	
Lewis	\$0.4	26	\$1.6	
Pacific+	-			
County Total	\$1.1	69	\$4.1	
Region Total	\$1.2	71	\$4.3	

Source: MIG, IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition, June 2000.

C. Air Travel Spending Impacts

A separate survey to gauge spending impacts by business and recreational air travelers in Washington was not conducted as part of this study. Estimates of air travel visitor spending (including pilot destination spending) and spending at air shows and other special aviation events are presented below. The Washington State Office of Trade & Economic Development compiles data on non-destination specific industries including air transportation (excluding air cargo operations) and travel arrangement. Specific destination spending impacts, including accommodations and purchases of food and beverages, ground transportation, recreation and retail sales, are not broken out by mode of travel. Air transportation and travel arrangement spending data for the year 1999 are summarized below.

In 2000, total spending on air transportation in Washington State totaled nearly \$2 billion, an increase of 5 percent since 1999. Air transportation spending supported 17,900 jobs in air transportation and travel arrangement industries. This represents an increase of nearly 2 percent since 1999 (Washington State Office of Trade & Economic Development, 2000).

Data on total spending on air transportation in Washington by county is only available for 1999. During that year, total spending on air transportation in Washington State totaled \$1.9 billion and supported 17,600 jobs. Spending impacts by county and region are presented in Table 10. These impacts do not



include total earnings or additional spending so represent a conservative picture of air travel spending impacts.

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Washington State				
Air Transportation Air Transportation Travel Arrangement				
Spending Employment Employment				
Washington	\$1,857,000,000	11,450	4,910	

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Central Puget Sound Region			
	Air Transportation	Air Transportation	Travel Arrangement
County	Spending	Employment	Employment
King	\$1,770,500,000	11,040	3,870
Kitsap	\$0	0	110
Pierce	\$7,400,000	ND	ND
Snohomish	\$6,500,000	50	380
Total	\$1,784,400,000	11,090	4,360
% of State	96.1%	94.0%	75.2%

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Eastern Region			
	Air Transportation	Air Transportation	Travel Arrangement
County	Spending	Employment	Employment
Adams+	\$0	0	ND
Lincoln	\$0	0	0
Pend Oreille+	\$0	0	ND
Spokane	\$46,300,000	360	310
Stevens	\$0	0	ND
Whitman	\$600,000	ND	ND
Total	\$46,900,000	360	310
% of State	2.5%	3.1%	5.3%

⁺ denotes no Air Transportation Industry.

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.



Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

North Central Region			
	Air Transportation	Air Transportation	Travel Arrangement
County	Spending	Employment	Employment
Chelan	\$800,000	ND	ND
Douglas	\$0	0	ND
Ferry+	\$0	0	0
Grant	\$8,600,000	ND	310
Okanogan	\$0	0	ND
Total	\$9,400,000		0
% of State	0.5%	%	%

⁺ denotes no Air Transportation Industry.

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Northwest Region			
	Air Transportation	Air Transportation	Travel Arrangement
County	Spending	Employment	Employment
Island	\$0	ND	ND
San Juan	\$0	0	20
Skagit	\$4,500,000	ND	ND
Whatcom	\$3,300,000	ND	ND
Total	\$7,800,000		20
% of State	0.4%	%	0.3%

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Olympic Region			
County	Air Transportation Spending	Air Transportation Employment	Travel Arrangement Employment
Clallam	\$600,000	ND	ND
Grays Harbor	\$0	0	ND
Jefferson	\$0	ND	ND
Mason	\$0	0	ND
Thurston	\$700,000	ND	ND
Total	\$1,300,000		
% of State	0.1%	%	%

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.



Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

South Central Region			
	Air Transportation	Air Transportation	Travel Arrangement
County	Spending	Employment	Employment
Benton	\$0	0	ND
Franklin	\$5,000,000	ND	ND
Kittitas	\$0	0	20
Walla Walla	\$1,300,000	ND	ND
Yakima	\$900,000	ND	ND
Total	\$7,200,000		20
% of State	0.4%	%	0.3%

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Southwest Region			
County	Air Transportation Spending	Air Transportation Employment	Travel Arrangement Employment
Benton	\$0	0	ND
Franklin	\$5,000,000	ND	ND
Kittitas	\$0	0	20
Walla Walla	\$1,300,000	ND	ND
Yakima	\$900,000	ND	ND
Total	\$7,200,000		20
% of State	0.4%	%	0.3%

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.

Table 10.
1999 Air Transportation and Travel Arrangement Spending and Employment Impacts

Southwest Region			
County	Air Transportation Spending	Air Transportation Employment	Travel Arrangement Employment
Clark	\$0	0	140
Cowlitz	\$0	0	40
Klickitat	\$0	0	ND
Lewis	\$0	0	20
Pacific+	\$0	0	ND
Total	\$0	0	200
% of State	%	%	3.4%

⁺ denotes no Air Transportation Industry.

ND denotes not disclosed.

Source: Washington State Office of Trade & Economic Development, 2000.

